AN

ACCOUNT

OF

Hydroſtatical & Pneumatical EXPERIMENTS.

To be Perform'd in the COURSE, at the Houſe of Mr. *Hauksbee*, in *Wine-Office-Court*, in *Fleet-ſtreet*.

By JAMES HODGSON and FRANCIS HAUKSBEE, F.R.S.

Hydroſtatical Experiments.

THAT the upper parts of all Fluids do actually preſs, gravitate, or weigh upon the lower.

That this Preſſure is communicated in *Orbem*, as well upwards as downwards, laterally as direct, and is the ſame in all Directions whatſoever.

That a lighter Fluid may gravitate upon an heavier, as well as an heavier upon a lighter.

That for the Aſcenſion of Water in Pumps, its Flowing thro' Syphons, *&c.* there needs nothing but a competent weight of an external Fluid.

That the weight of Water preſſing againſt the Fund of any Veſſel, is to be eſtimated by a Priſm of Water; having for its Baſe the Fund of the Veſſel, and height equal to the perpendicular height of the Water.

That therefore, howſoever differently the Pipes are form'd, yet if their Baſes are equal, the Fluids contain'd within 'em ponderate equally.

That a Solid Body, as ponderous as any yet known, (tho' near the top of the Water, it will ſink by its own weight) yet if placed at a greater depth than that of twenty times its own thickneſs, it will not ſink; if its deſcent be not aſſiſted by the weight of the incumbent Water.

That all Bodies being either heavier, equal or lighter, than a like Bulk of Water, will, if let into Water, ſink, if they are heavier; if of the ſame weight, ſwim, in that ſtation where they ſhall be placed; if lighter, float above the Surface of the Fluid, and will, before they ſink, require a weight to be added to 'em equal to the difference of the weight of the Body, and a like Bulk of the Fluid.

The

The Specifick Gravities of ſeveral ſorts of Metals, Minerals, Liquors, &c. determin'd; whence the abſolute Gravity of one being known, the abſolute Gravities of the reſt may be eaſily had.

Pneumatical Experiments.

The Preſſure of the Air prov'd in general, by ſhewing, That

Mercury is not to be elevated higher in an open Tube by the greateſt Exhauſtion, than 'tis at the ſame time ſuſpended in the Barometer by the preſſure of the common Air.

A Glaſs Vial may be broke, by laying the preſſure of the Air on its outward Surface.

A Glaſs Vial being immers'd and detain'd under Water, may be broke by laying the Preſſure of the External Air on the Surface of the Liquid, the Air contain'd in the Vial having been firſt withdrawn.

The Preſſure of the Air may be made ſenſible to the Touch.

The Preſſure of the Air prov'd in oppoſition to Suction, *by ſhewing,*

That Water will not ſucceed the Sucker of a Syringe, unleſs it be aſſiſted by the Preſſure of the External Air.

That when the Preſſure of the External Air is taken off, 'tis very eaſie to draw up the Sucker of a Syringe, tho' the Hole at which the Air or Water ſhould ſucceed be ſtopt.

That upon opening of a Syringe, whoſe Pipe is ſtopt, in the exhauſted Receiver, the Preſſure of the Air will lift a conſiderable weight.

The Preſſure of the Air prov'd in oppoſition to the Funicular *Hypotheſis, by ſhewing,*

That the *Mercury* in the *Torricellian* Experiment will gradually deſcend as the quantity of the external Air is leſſen'd, on the Surface of the ſtagnant Quickſilver, till at laſt *in Vacuo* it ſubſides to near the level of that which is contain'd in the Ciſtern.

That a Tube, hermetically ſeal'd at one end, being fill'd full of Water, and its open end immers'd under ſome of the ſame Liquid, will (upon the abſence of the Air) deſcend to near the Level of the Surface of that at bottom, in ſpight of the *Funicular* Power, at ſuch a time to retain ſo light a Body ſuſpended.

An Experiment tending to ſhew the Cauſe of the Riſing and Falling of the Mercury *in the common Weather-glaſs; by ſhewing,*

That high Winds are capable ſo to leſſen the Preſſure of the Air on the Surface of the *Mercury* in the Baſon, as to cauſe the *Mercury* in the Barometer conſiderably to deſcend.

Experiments tending to prove, That the Air is ſo far from being the Cauſe of Gravity, that it is a great Impediment to it, by ſhewing,

That a piece of Gold and a Feather being included *in Vacuo*, and dropt at the ſame time from the top of a tall Recipient, the Feather meeting

meeting with no reſiſtance from the Air, deſcends with the ſame Velocity as the Gold.

That Duſt, which in common Air will float a conſiderable time, *in Vacuo* will deſcend as a ponderous Body.

The Abſolute Gravity of the Air determin'd,

By ſhewing the proportion of the Weight of Air, to a like bulk of Water or Quickſilver.

Several Experiments, demonſtrating the Spring of Uncompreſs'd Air, or its Elaſticity, by ſhewing,

That a little Air being included in the Folds of a Bladder, the Neck of which being cloſely ty'd, and then convey'd under a Receiver, which being exhauſted by the Pump, the ſmall quantity of Air contain'd in the Bladder will ſo expand itſelf, as to ſwell the Bladder to its greateſt dimenſions.

That a Bladder well blown will be burſt *in Vacuo*, by the bare ſpring of its included Air.

That a quarter-part of as much Air as a Bladder ſhall naturally hold, being included and confin'd by cloſely tying its Neck, then a Weight of 20, 30, or a greater number of Pounds, being conveniently placed upon it, and all cover'd with a Receiver, which well exhauſted, the Air contain'd in the Bladder will ſo exert its Spring, as to move and raiſe the incumbent Weight.

That a Glaſs Vial, being cloſely ſtopt, will (upon the abſence of the ambient Air, by the Spring of its included Air) be broke into a multitude of pieces.

That a Glaſs Vial, being immers'd and detain'd under Water, upon the withdrawing of the Air from the Surface of the Liquid, the Air included in the Vial will ſo exert its Spring, as to break it violently, notwithſtanding the intervention of the Liquid.

A ſurprizing *Phænomenon*, upon taking the Preſſure of the Air from the Surface of warm Water.

That abundance of Particles of Air are diſcoverable in Common Water, upon the abſence of the ambient Air.

Experiments in Compreſs'd Air.

Sound to encreaſe, according to the degrees of Condenſation. And the contrary.

The breaking of round Glaſs Vials in compreſs'd Air, notwithſtanding the Reſiſtance from their Form and the included Air.

An Experiment tending to prove,

That the Springs or Conſtituent Parts of Air, are capable to ſuffer ſuch diſorder by a violent Impulſe, as to require Time to recover their Natural Strength again.

The Preſſure of the Air prov'd, in oppoſition to Nature's Abhorrence of Vacuum; by ſhewing,

That it requires the ſame difficulty to ſeparate two Hemiſpheres only upon

upon injecting an Atmoſphere of Air on their outward Surfaces, as if their inward or contain'd Air was exhauſted from 'em.

That it requires double the difficulty afore-mention'd, upon exhauſting the inward Air, and then injecting an Atmoſphere of Air on the outward Surfaces of the ſame Hemiſpheres.

An Experiment,

Shewing, That the Air's Preſence, or at leaſt ſome degree of it, is abſolutely neceſſary, in the Production of Fire upon the Colliſion of Flint and Steel.

Several Experiments, ſhewing the Preſence of the Air *to be eſſentially neceſſary to the Conſervation of Life.*

An Experiment,

Shewing, That the Air's Preſence is no way neceſſary in the Production of that odd *Phænomenon*, the ſeeming-ſpontaneous Aſcenſion of Water in ſmall Tubes, or between two Glaſs Planes.

Experiments about Firing of Gun-powder, Aurum Fulminans, *or any other eaſie-inflamable Matter, on a Candent Iron.*

Several new Experiments on Electricity, or Attraction of Bodies, viz.

That upon the Attrition of a Glaſs Tube, light Bodies may be mov'd at a conſiderable diſtance from it.

That upon the Attrition of a Globe Glaſs, Threds that are conveniently fix'd will tend to the Centre of it, in all manner of Poſitions. And further, 'tis very ſurprizing, to ſee the directed Threds flee the approach of any body, held near 'em.

That upon the Attrition of Glaſs or Sealing-wax, Bodies may be mov'd within a Glaſs, notwithſtanding the Interpoſition of ſo ſolid a Body.

Several new and ſurprizing Experiments, in relation to the production of Light upon the Attrition of Glaſs Bodies, viz.

That upon the Attrition of a Glaſs Globe exhauſted of its Air, a Light ſo conſiderable will be produc'd, that *Words* in *Capital Letters* may be read by it; with other various *Phænomena* exhibited upon letting in the Air.

That when the Globe is replete with Air, it is very curious to ſee, that upon the Attrition of it, a Light will be communicated to Bodies at two or three inches diſtance from it.

NB. *For the Benefit of* Gentlemen *who ſhall be preſent at the making the* Experiments, *there will be a Diſcourſe of their Nature and Uſe.*

Thoſe who deſire to be preſent, muſt pay Two Guineas; *one at the time of Subſcription, the other on the third Night after the Courſe begins.*

Subſcriptions *are taken by Mr.* HAUKSBEE, *at his Houſe, aforemention'd.*